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Amperometric immunoassay of azinphos-methyl in water and honeybees based on indirect competitive ELISA

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Abstract

An electrochemical immunosensor based on indirect competitive ELISA technique has been developed and tested for the detection of azinphos-methyl in aqueous solutions and spiked honeybee extracts. The detection of the pesticide was based on competition for binding to monoclonal antibodies with an ovalbumin (OVA) conjugate, followed by the incubation with anti-mouse IgG labeled with horseradish peroxidase, whose activity was measured amperometrically with hydroquinone as the substrate. The sensitivity of the azinphos-methyl assay, estimated as the IC50 value, was found to be 1.2 nmol L-1 (60 min incubation), with a linear range of 0.6-500 nmol L-1 in optimal conditions. The matrix effect on the detection of azinphos-methyl in honeybee extract was found negligible, with the recovery values in the range 92-105%.

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Keywords

Azinphos-methyl, Electrochemical immunoassay, ELISA, Immunosensor, Monoclonal antibody